

THE GENERA OF HAMAMELIDACEAE AND PLATANACEAE
IN THE SOUTHEASTERN UNITED STATES¹

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HAMAMELIDACEAE R. Brown in Abel, Narr. Journ. China 374. 1818,
"Hamamelideae," nom. cons.
(WITCH-HAZEL FAMILY)

Deciduous [or evergreen], $\pm$ pubescent trees or shrubs. Leaves simple, usually with deciduous stipules [or stipules fused or rarely absent], petio-
late, alternate [or opposite], pinnately (or palmately) veined [sometimes
dimorphic]; stomata abaxial, paracytic. Hairs usually nonglandular, stel-
late or tufted, the individual members unicellular (or hairs simple). In-
florescences bracteate, axillary or terminal, $\pm$ capitate or spicate (or $\pm$
racemose). Flowers $\pm$ regular, subhypogynous to subepigynous, bisexual
or unisexual (the plants then monoecious [rarely dioecious]); perianth
4(5)-merous, cyclic, 1- or 2-seriate, often reduced or $\pm$ absent. Calyx
apparently united, 4- or 5(7)-lobed, usually persistent and $\pm$ adnate to
the fruit or $\pm$ absent [or sepals connate or circumscissile]. Corolla apopet-
alous or absent. Stamens 4, alternipetalous, with alternating staminodia,
or many and indefinite; [connective often conspicuous;] anthers usually
basifixed, with 2 or 4 pollen sacs, becoming 2-locular at anthesis; dehis-
cence longitudinal by a simple slit, or by 1 or 2 vertical valves; pollen
mostly 3-colpate (or polyporate). Gynoecium $\pm$ syncarpous, usually
2-carpellate; stigmas terminal or introrsely decurrent; styles free, usually
spreading; ovary 2-locular, usually somewhat embedded in the receptacle
[to inferior]; placentation $\pm$ axile; ovules 1 (2) in each locule and apical
(or many), anatropous, pendent, 2-integumented, the micropyle upward.
Fruits partly inferior or somewhat inclosed by the calyx, with leathery
exocarp and bony endocarp, often appearing to separate apically into
4 persistent valves; dehiscence loculicidal, the fruits 2-seeded (or septicidal

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with most of the many seeds per locule aborted). Seeds oblong, lustrous, hard, often with a pale region merging with the apical hilum and decurrent on 2 sides (or seeds winged and the hilum lateral); embryo straight; endosperm present. (Including Altingiaceae Lindley.) TYPE GENUS: *Hamamelis* L.

About 23 genera and 100 species, concentrated in China, absent from western North America, the West Indies, South America, Polynesia, and Europe. Perhaps 13 genera are monotypic; about five are native to the New World. Several taxa are widely represented in northern fossil deposits.

Among the unifying landmarks of Hamamelidaceae are pinnately veined leaves, bicarpellate, $\pm$ bilocular, usually 2-seeded, loculicidal fruits with leathery exocarp, bony endocarp, lustrous seeds with characteristic apical marking associated with the hilum, and predominantly tricolpate pollen (cf. *Liquidambar*). Also characteristic of the family, and of interest morphologically, are the diversity of staminal structure and the often intermediate conditions of capitate, spicate, or somewhat catkin-like inflorescences; of reduction of perianth; of suppression of one sex (polygamy); and of epigyny, perigyny, and subhypogyny.

Placing primary emphasis on the number of ovules per locule, Niedenzu divided Hamamelidaceae into subfam. Bucklandioideae Niedz. (including *Liquidambar*) and subfam. Hamamelidoideae, both with two tribes. In the latter, tribe Hamamelideae, with short staminal filaments and capitate inflorescences, was separated from Parrotieae Gardn. (including *Fothergilla*), with spikelike inflorescences and long staminal filaments. Later, Harms recognized five subfamilies, among them Liquidambaroideae and Hamamelidoideae, the latter comprised of five tribes, including Hamamelideae and the apetalous Fothergilleae DC. In either system, the bulk of the taxa is referred to Hamamelidoideae. (See Gardner for an additional taxonomic scheme.)

In contrast to the apparently reduced floral morphology of many Hamamelidaceae, the tracheary structure is relatively unspecialized, the vessels having exclusively scalariform perforation plates. On the one hand, anatomical affinities are with some Magnoliales, and, on the other, with Casuarinales, Fagales, and Urticales (Tippo). Hamamelidaceae are similar to, but structurally more primitive than, Buxaceae, Platanaceae (*q.v.*), and Urticaceae. Anatomically, Rosales, from which Hamamelidaceae sometimes are considered derived, are more advanced. (For more details see Tippo and Tang.)

Chromosome numbers of $2n = 24, 30, 32, 48$, and 72 have been reported.

Several arborescent species provide useful timber; a fragrant exudate, styrax, is obtained from *Liquidambar* and *Altingia*; an extract of bark and leaves of *Hamamelis virginiana* is the source of witch-hazel. Handsome representatives of several genera are cultivated and often are valued for their vivid autumn coloration.

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KEY TO THE GENERA OF HAMAMELIDACEAE

- General characters: *shrubs or trees with simple, alternate, deciduous leaves; flowers clustered, various, ± regular, subhypogynous to subepigynous, unisexual or bisexual; perianth ± reduced; ovary 2-carpellate, ± 2-locular with ± axile placentation; ovules pendent with micropyle upward; fruits with bony endocarp ± half inferior, loculicidal and 2-seeded (or septicidal, the fertile seeds winged).*
- A. Leaves pinnately veined; flowers usually bisexual; ovules 1 per locule; fruits loculicidal, often appearing 4-valved, seeds not winged; usually shrubs.
- B. Inflorescences axillary, capitate, 1–5-flowered; petals yellow to red; stamens 4; fruits maturing in the fall. 1. *Hamamelis*.
- B. Inflorescences terminal, spicate, many flowered; petals absent; stamens many, the filaments white and conspicuous; fruits maturing in the summer, the inflorescence soon deciduous. 2. *Fothergilla*.
- A. Leaves palmately veined and lobed; flowers mostly unisexual, in separate

inflorescences; perianth obsolete; ovules many per locule; fruits septicidal; fertile seeds few and winged; forest trees. 3. *Liquidambar*.

Subfam. HAMAMELIDOIDEAE

Tribe HAMAMELIDEAE

1. *Hamamelis* Linnaeus, Sp. Pl. 1: 124. 1753; Gen. Pl. ed. 5. 59. 1754.

Shrubs (or trees); leaves pinnately veined, $\pm$ unequal at the base. Inflorescences $\pm$ axillary, $\pm$ capitate, pedunculate, with a few bracteoles, usually of 3 (1–5) flowers. Flowers bisexual (or functionally unisexual, the plants then polygamous). Calyx deeply 4(5)-parted. Petals 4 (5), ligulate, with circinate vernation, yellow to dark red. Fertile stamens 4, alternipetalous, included; anthers introrse, 2-locular at anthesis, dehiscing by 2 valves hinged adaxially at the connective; pollen 3-colpate; staminodia 4, short, antipetalous. Ovary $\pm$ slightly recessed in the receptacle, 2-locular below, deeply 2-parted above into 2 styles; ovules pendent from the apex of the locule, 1 (2) in each locule. Fruits maturing in the fall, $\pm$ woody, partly inferior, fused $\pm$ to the middle with the persistent tubular calyx. Seeds usually 1 per locule, oblong, lustrous, forcibly discharged after dehiscence; hilum apical and surrounded by a pale area decurrent on 2 sides. TYPE SPECIES: *H. virginiana* L. (Ancient Greek name for a plant with apple-like fruits; perhaps derived from *hama*, together, and *melon*, fruit.) — WITCH-HAZEL.

Perhaps six species of temperate eastern Asia and eastern North America; in our area widely distributed.

Hamamelis virginiana, $2n = 24$, distributed from Florida to Texas, northward to Ontario and Nova Scotia, tends to flower on the autumn side of winter, often as the leaves are falling (sometimes as late as December), has only weakly fragrant flowers with long yellow petals, and usually grows in a woodland habitat. Fertilization of the ovules occurs five to seven months after pollination (Shoemaker); the fruits mature during the next blooming season. The var. *macrophylla* (Pursh) Nutt. (*H. macrophylla* Pursh), of uncertain status (see Sargent, 1920), the leaves smaller and with tuberculate surface, flowering from December through February, has been reported to a height of 15 m. and nearly a foot in diameter. The vars. *angustifolia* Nieuwl., *orbiculata* Nieuwl., and *parvifolia* Nutt. (f. *parvifolia* (Nutt.) Fernald) are based on characteristics of the leaves; f. *rubescens* Rehder has light-red petals. Resembling *H. virginiana* is the little-known *H. mexicana* Standl., of Nuevo León, Mexico, which has yellow petals and apparently blooms in July.

Of more limited distribution, *Hamamelis vernalis* Sarg., $2n = 24$, is restricted, perhaps ecologically, to the Ozark Region in an area extending from southeastern Missouri through Arkansas to southeastern Oklahoma. It tends to be a lower, stoloniferous, thicket-forming shrub of gravelly margins of streams that blooms on the spring side of winter and has fragrant flowers with shorter petals. The fruits mature in the first summer



FIG. 1. *Hamamelis*. a-j, *H. vernalis*: a, vernal branch, with flowers, $\times 1$; b, inflorescence of three flowers, petals removed to show involucre-like bracts and sepals, $\times 4$; c, flower at anthesis, the anthers closed, $\times 4$; d, flower in vertical section, stamen at right removed to show staminodium opposite petal, $\times 5$; e, two stamens, showing valves and dehiscence, $\times 14$; f, stamen, showing connective, $\times 14$; g, two views of staminodia, $\times 14$; h, autumnal branch, with ripening fruits and nodding inflorescences with flower buds, $\times \frac{1}{2}$; i, loculicidally dehiscent fruit, seeds discharged, $\times 2$; j, seed — note apical characteristics, $\times 4$. k, *H. virginiana*: flower — note petal proportions, staminodia opposite petals, and open anthers, $\times 5$.

or autumn. The lower surface of the leaves tends to be glaucous-pubescent and the calyx red within, but the species is variable in most respects. Plants with pure yellow petals and plants with red petals (nearly every bush having its own petal hue) may grow side by side; the color patterns are constant in cultivation (Anderson, 1933). The leaves persist into winter, the fragrance of the flowers is diminished by low temperatures, and the petals recoil on cold days (Anderson, 1934). Forma *tomentella* Rehd. (var. *tomentella* (Rehd.) E. J. Palmer) is especially pubescent; f. *carnea* Rehd. has dark red petals.

In Missouri, the habitats of *Hamamelis vernalis* (flowering in February) and *H. virginiana* (flowering in November) overlap, but interspecific crossing apparently is precluded by the disparate periods of anthesis (Steyermark, 1934). *Hamamelis vernalis* shows a high degree of intra-regional variability, but interregionally, *H. virginiana* perhaps is as variable (Anderson, 1933). The interrelationship of these species requires further study.²

The native variability of *Hamamelis* notwithstanding, speciation apparently has affected primarily blooming season and petal length and color; determination of strictly vegetative material is often difficult. Our species usually have yellow autumnal leaves, while the species of Asia, all spring flowering, sometimes have reddish or orange leaves in autumn. *Hamamelis* × *intermedia* Rehd. originated in cultivation, presumably as a hybrid between *H. japonica* Sieb. & Zucc., of Japan, and *H. mollis* Oliv., of central China. The genus is valued in horticulture for its unusual blooming season. Some branchlets have close, distichous nodes and appear zigzag.

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² Sargent (Trees & Shrubs 2: 137, 138. pl. 156. 1911) gives the petal color of *Hamamelis vernalis* as light yellow and shows a flowering twig that could pass for *H. virginiana*. The most distinctive element of this complex, however, appears to be *H. vernalis* f. *carnea*, which has red petals. The nomenclatural type of *H. vernalis*, viz., f. *vernal*, may be an intermediate of some kind between the distinctive f. *carnea* and *H. virginiana*. This points out a conflict between the biological and nomenclatural aspects of our taxonomic method which perhaps is accountable for some of the apparent confusion in the identity of these two species.

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Tribe FOTHERGILLEAE DC.

2. *Fothergilla* Murray, Linn. Syst. Veg. ed. 13. 418. 1774.

Shrubs; leaves pinnately veined, $\pm$ unequal at the base. Inflorescences erect, $\pm$ terminal, many flowered, racemose, deciduous. Flowers bisexual or the lowest flowers $\varnothing$ -sterile, weakly perigynous, apetalous; receptacle shallowly campanulate with 5-7 stubby, calyx-like teeth. Stamens indefinite (about 24), unequal, exserted; filaments expanded, $\pm$ clavate, white, conspicuous; anthers with 4 pollen sacs, becoming 2-locular at anthesis; dehiscence of each locule I-shaped, the locule opening by 2 flaps. Ovary slightly recessed in the receptacle, 2-locular below, 2-parted above into 2 styles, the stigmas introrsely decurrent; ovules solitary, pendent from the apex of each locule. Fruit partly inferior, fused $\pm$ to the middle with the receptacle-calyx, loculicidal (and $\pm$ septicidal), maturing in summer. Seeds 1 per locule, oblong, lustrous, hilum apical and surrounded by a pale area that usually is decurrent on 2 sides. TYPE SPECIES: *F. Gardenii* Murray. (Named for John Fothergill, 1712-1780, English physician and champion of the American colonists during the Revolution, in whose garden many American plants were first cultivated in the Old World.)

Two or three species endemic to our area, distributed from Alabama to Kentucky, North Carolina, and southeastern Virginia. *Fothergilla Gardenii* (*F. alnifolia* L. f., *F. carolina* (L.) Britt., *F. parvifolia* Kearney in Small), $2n = 72$,³ dwarf witch-alder, is a low (usually less than 1 m.), stoloniferous shrub of wet, sandy soils of the Coastal Plain from southeastern Virginia (?) and southeastern North Carolina to Alabama. *Fothergilla major* (Sims) Lodd. (*F. alnifolia* var. *major* Sims), $2n = 72$,³ with leaves glaucous and pubescent beneath, is an upright shrub (to 3 m.) of the southern Appalachians in North Carolina, Tennessee, Georgia, and Alabama; *F. monticola* Ashe, $2n = 48$,³ with leaves only sparingly pubescent beneath, is distributed with the latter and appears to be almost in-

³Chromosome number determined by Dr. J. L. Thomas from cultivated plants of the Arnold Arboretum. The number for *Fothergilla Gardenii* (Arnold Arb. no. 684-50) is reported here for the first time. Counts of *F. major* (Arnold Arb. no. 694-34) and *F. monticola* (Arnold Arb. no. 4163A) verify the earlier reports of Anderson & Sax. The determinations were made from pollen mother cells.



FIG. 2. *Fothergilla*. a-g, *F. major*: a, flowering branch, $\times \frac{1}{2}$; b, bisexual flower after anthesis, showing styles near center, $\times 2$; c, two flowers, stamens removed to show diverging styles with decurrent stigmas, $\times 2$; d, two anthers, showing mode of dehiscence, $\times 18$; e, summer shoot with mature fruits, $\times \frac{1}{2}$; f, open fruit, seeds discharged, showing loculicidal and partially septicidal dehiscence, $\times 2$; g, seed, color pattern omitted—note apical characteristics, $\times 4$.

distinguishable from it. The interrelationships of the species are uncertain and in need of study.

The species of *Fothergilla* are handsome, spring-flowering shrubs with distinctive upright spikes of apetalous flowers with conspicuous white stamens; the leaves sometimes develop brilliant crimson autumnal coloration. In the vegetative stage *Fothergilla* and *Hamamelis* sometimes are surprisingly similar, but the characters common to both genera also are common to the nucleus of hamamelidaceous genera; both genera have some affinities with Old World taxa.

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Subfam. LIQUIDAMBAROIDEAE Harms in Engler & Prantl

3. **Liquidambar** Linnaeus, Sp. Pl. 2: 999. 1753; Gen. Pl. ed. 5. 434. 1754.

Trees to about 35 m. tall, usually with excurrent branching; bark often forming corky wings on twigs. Leaves palmately veined, [3- or] 5(7)-lobed, pubescent beneath when young, smooth, glandular, serrate, pleasantly scented when crushed, variously colored in autumn. Hairs simple. Inflorescences at ends of branchlets, bracteate, mostly unisexual, the plants monoecious, the perianths $\pm$ absent. Staminate inflorescences elongate, $\pm$ racemose, composed of globular masses of numerous stamens, these not organized into distinct flowers; each stamen mass pediceled and subtended by a deciduous bract or sessile; anthers on short filaments, 2-locular at anthesis, longitudinally dehiscent; pollen polyporate; ovaries absent. Carpellate inflorescences many flowered, spherical, long peduncled, pendent, 1(or more)-bracteate; receptacle of each flower $\pm$ campanulate and $\pm$ connate with adjacent flowers, broadly notched, with 4–5 [8–9] perigynous, usually ? rudimentary stamens; ovary partly inferior; stigmas introrsely decurrent; styles spreading; ovules numerous, $\pm$ in 4 rows in each locule, mostly aborting, only the basal 1 (2) ovules functional. Fruits $\pm$ connate, septicidal; maturing in autumn. Seeds few, 1 (2) per locule, winged apically, the hilum $\pm$ lateral. LECTOTYPE SPECIES: *L. styraciflua* L.; see Aiton, Hort. Kew. 3: 334. 1789. (Name from Latin, *liquidus*, fluid, and Arabic, *ambar*, resin.) — SWEET GUM, RED GUM, STAR-LEAVED GUM, BILSTED, ALLIGATOR-TREE.

Three arborescent species of the Northern Hemisphere, occurring in Asia Minor, eastern Asia, and eastern North America and Central America. Section LIQUIDAMBAR (§ *Euliquidambar* Harms), is represented with us by *L. styraciflua* (including var. *mexicana* Oerst. and *L. macrophylla* Oerst.), $2n = 30, 32$, a common forest tree distributed from Texas to

Florida northward to Connecticut and in the Mississippi drainage to southern Illinois, Indiana, and Ohio, mostly at lower altitudes. It occurs discontinuously in Mexico and southward to Honduras at higher altitudes (to 2200 m.). The leaves usually are 5(7)-lobed with $\pm$ straight, serrated margins. Forma *pendula* Rehd. (Arkansas) and f. *rotundiloba* Rehd. (North Carolina) were based on single trees. The leaves of *L. orientalis* Mill., $2n = 32$, of Turkey (?), also are 5(7)-lobed, but the margins usually are subdivided further. Leaves of *L. formosana* Hance (§ CATHAYAMBAR Harms), of Taiwan and China, usually are simply 3-lobed, and the ♀ flowers are separated from one another by elongate, pointed scales which are lacking in the other species.

With its palmately veined and lobed leaves, numerous ovules, septicidal fruits, winged seeds, and polyporate pollen, *Liquidambar* appears discordant in Hamamelidaceae. This remoteness has led some authors to place it along with *Altingia* Noronha, a genus of southeastern Asia, usually with pinnately veined leaves, in Altingiaceae. Although crystals and secretory elements (including individual cells and canals) appear to be widespread in the family, it is in *Liquidambar* and *Altingia* that vertical, traumatic-type medullary canals are found close to the protoxylem. (See Metcalf & Chalk, and Tipppo, 45.) The familial affinities of *Liquidambar* cannot be evaluated solely by comparison with *Hamamelis* and *Fothergilla* but perhaps can be understood by comparison with other genera in Asia.

Styrax or liquid storax (not to be confused with storax from *Styrax officinale* L.), a balsamic resin exudate of trunk wounds on *Liquidambar*, originally obtained from *L. orientalis*, is pleasantly scented and has been used in incense, perfumery, medicine, and chewing gum. Valued for its fall color, rate of growth, and trim lines, *L. styraciflua* is frequently cultivated for ornament. The wood has some desirable qualities and is known as satin walnut.

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PLATANACEAE Dumortier, Anal. Fam. 11, 12. 1829, "Plataneae," nom. cons.
(PLANE-TREE FAMILY)

A distinctive, monogeneric, arborescent family of uncertain affinity, easily recognized by the characteristic mottled bark; the axillary buds inclosed by the base of the petiole; the fragrance of the broad, palmately lobed leaves; and the pendent, unisexual globes of numerous, minute flowers with reduced, $\pm$ cyclic, hypogynous perianth, apocarpous gynoecium, and fruit of several bristly achenes.

1. *Platanus* Linnaeus, Sp. Pl. 2: 999. 1753; Gen. Pl. ed. 5. 433. 1754.

Large trees with pale, $\pm$ smooth, mottled bark, exfoliating in irregular, darker scales at least on the upper branches; young leaves, twigs, inflorescences, and most floral members copiously pubescent. Hairs long, multicellular-uniseriate, and bristly, or shorter, with whorls of unicellular branches, and matted, sometimes appearing almost stellate. Leaves decidu-

ous, petiolate, alternate, pleasantly fragrant, broad, palmately veined, 3- or 5[7]-lobed [or oblong, pinnately veined and entire in *P. Kerrii*], the base of the petiole concealing the conical axillary bud; stipules paired or united, foliaceous or scarious. Plants monoecious; inflorescences at ends of branchlets, long-pedunculate, pendent, usually unisexual, of 1 (2) [or more] globes of numerous flowers; each globe subtended by a circular bract and with bractlets interspersed among the flowers. Staminate inflorescences disintegrating after anthesis; ♂ calyx minute, cup shaped, ± shallowly 3–6(8)-lobed [absent in *P. racemosa*]; petals 3–6, glabrous, ± fleshy, 3-pronged, sometimes ± connate, fitting ± between the stamens in *P. occidentalis* and *P. × acerifolia* (here resembling the staminodia of the ♀ flowers) [or petals sometimes low, rounded knobs in *P. racemosa*]; stamens 3–5 (8), alternate with the petals; filaments very short; anthers elongate, with characteristic, polygonal, truncate apex, 2-locular at anthesis, the dehiscence longitudinal; pollen 3-colpate; rudimentary carpels occasionally present. Carpellate inflorescences persisting in fruit; ♀ flowers hypogynous; calyx minute, cup shaped, shallowly 4(3–6)-lobed [aposepalous and resembling bracts in *P. orientalis* and *P. racemosa*]; apetalous(?) [or apopetalous in *P. × acerifolia* and *P. orientalis*]; gynoecium apocarpous, of 5–9 carpels ± in 2 or 3 series, the outer carpels alternating with a series of 3 or 4 staminodia; stigmatic region introrse and decurrent from the apex of the elongate style; ovaries superior, unilocular; ovules usually solitary (or 2 or more and rudimentary), ± orthotropous, 2-integumented, pendent, the micropyle downward. Fruit of 5–9 achenes each with 1 (2) seeds, narrowly angular-clavate, ± truncate [to attenuate], tapering into the narrow style, surrounded from the base by long bristles; seed spindle shaped; radicle downward; cotyledons ± unequal; endosperm scanty. LECTOTYPE SPECIES: *P. orientalis* L.; see N. L. Britton, N. Am. Trees 415. 1908. (Name Greek, probably from *platys*, broad, in reference to the leaves.) — PLANE TREE, SYCAMORE, BUTTONWOOD, BUTTONBALL.

Perhaps eight or nine species, mostly of the North Temperate Zone, distributed in Eurasia, North America south to Guatemala, and Indochina. Two or three species, usually of riparian associations and at lower altitudes, are indigenous to the United States. About five species are native to Mexico and Central America, where they occur at somewhat higher altitudes (to 6000 ft.). Fossil traces are reported as early as the Cretaceous and as far north as Greenland.

Platanus occidentalis L., $2n = 42$, usually with only one globe of flowers on a peduncle, the largest of our deciduous trees (to ca. 45 m. tall, and 3.5 m. in diameter), is distributed from Florida to Texas and north to Nebraska, Ontario, and Maine; var. *glabrata* (Fern.) Sarg., and f. *attenuata* Sarg. are based on leaf characters.

Platanus × acerifolia (Ait.) Willd. (pro sp.), $2n = 42$, London plane, hardy, and widely cultivated as a street tree, in some respects combines characters of *P. orientalis*, $2n = 42$, a native of southern Europe and west-

ern Asia, and *P. occidentalis*. It is said to be of hybrid origin and to have originated in 1670 in England (Henry & Flood), although *P. orientalis* may not be hardy in England (Li). The pollen of *P. × acerifolia* is 90% fertile (Sax); "first generation hybrids" are mixed and variable (Henry & Flood); however, no one seems to have attempted to resynthesize the hybrid experimentally.

The taxa of *Platanus* mostly are circumscribed on characteristics of the leaves and inflorescences rather than on floral structure. Contradictory accounts of the flowers are given by several authors.⁴ Accountable are both the minute, mostly rudimentary and variable perianth requiring microscopical methods for effective study and the possible misdetermination of study specimens. The calyx and corolla, consisting (when present) of regular, alternating series, are devoid of vasculature, while the staminodia, stamens, and gynoecia receive tracheary tissue. Unlike other floral organs, the petals are glabrous; they are present in all staminate flowers, and here they may have fragments of vascular tissue beneath them. Staminate flowers are more consistent in structure than carpellate flowers (Boothroyd). The flowers are occasionally unilateral, with the floral members in imperfectly alternating series, and staminate flowers sometimes are separated with difficulty (Clarke).

Anatomically, *Platanus*, having vessels with simple perforations, is more advanced than Hamamelidaceae but less specialized than Rosaceae (Tippo). The genus probably is without close relatives. A direct relationship with Hamamelidaceae is not suggested by the floral morphology. The discovery of *Platanus Kerrii* Gagnep. in Laos is interesting, since it is the only representative of the genus in eastern Asia and the ovate-lanceolate leaves are pinnately veined with entire margins. Seedling leaves of other species apparently are pinnately veined.

The wood of *Platanus*, sometimes known as lacewood, usually is not durable but has been used for miscellaneous objects. The hairs sometimes are claimed to be irritating to mucous membranes.

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⁴This presentation of *Platanus* is based primarily upon that of Boothroyd which sometimes is not very clear.

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